Hovsepian v. Apple, Inc.

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United States Court of Appeals,
Federal Circuit.
HARRIS CORPORATION, Plaintiff-Cross Appellant,
v.
ERICSSON INC., Defendant-Appellant.
Nos. 03-1625, 03-1626.

Aug. 5, 2005.

Background: Patent holder brought action against competitor alleging infringement of patent directed toward way that wireless signals were processed through computer program. The United States District Court for the Northern District of Texas, Barbara M.G. Lynn, J., granted judgment for patent holder, 2003 WL 21750710. Both parties appealed.

Holdings: The Court of Appeals, Prost, Circuit Judge, held that:
(1) argument that computer-implemented means-plus-function terms were restricted to algorithm disclosed in specification had not been waived;
(2) competitor's appeal of denial of its motion for judgment as matter of law (JMOL) was not precluded, on theory of waiver, by competitor's failure to object to jury instructions on infringement;
(3) corresponding structure for "time domain processing means" was microprocessor programmed to carry out two-step algorithm in which processor calculated generally non-discrete estimates and then selected discrete value closest to each estimate;
(4) claim could have been directly infringed only by one who used that system;
(5) blended royalty rate could not be used when all infringement for which damages were available took place after lower rate came into effect;
(6) review of damages issues briefed by parties on appeal was warranted due to interests of judicial economy;
(7) substantial evidence supported jury's finding of willful infringement; and
(8) enhanced damages award was not abuse of discretion.
Vacated in part, reversed in part, and remanded.

Gajarsa, Circuit Judge, filed dissenting opinion.

[1] **Patents 324.5**

291k324.5 Most Cited Cases
A district court's patent claim construction is reviewed de novo.

[2] **Federal Courts 776**
170Bk776 Most Cited Cases
A lower court's denial of a motion for judgment as a matter of law (JMOL) is reviewed de novo. Fed.Rules Civ.Proc.Rule 50(a)(1), 28 U.S.C.A.

[3] **Federal Courts 765**
170Bk765 Most Cited Cases
In the United States Court of Appeals for the Fifth Circuit, appellate review of a denial of a motion for judgment as a matter of law (JMOL) is a determination of whether the facts and inferences point so strongly and overwhelmingly in favor of one party that the court concludes that reasonable jurors could not arrive at a contrary verdict. Fed.Rules Civ.Proc.Rule 50(a)(1), 28 U.S.C.A.

[4] **Patents 324.54**
291k324.54 Most Cited Cases
When reviewing a district court's award of reasonable royalty damages in a patent case, an appellate court must determine if the district court abused its discretion in its methodology for calculating the royalty; abuse of discretion occurs when a court bases its determination on clearly erroneous factual findings, legal error, or a manifest error of judgment.

[5] **Patents 324.54**
291k324.54 Most Cited Cases

[5] **Patents 324.55(1)**
291k324.55(1) Most Cited Cases
District court's award of enhanced damages for willful patent infringement is reviewed under an abuse of discretion standard, and the jury's underlying factual finding of willfulness is reviewed for substantial evidence.

[6] **Patents 324.1**
291k324.1 Most Cited Cases
Competitor did not waive, and was not estopped from asserting, argument on appeal, that computer-

implemented means-plus-function terms in patent directed toward way that wireless signals were processed were restricted to algorithm disclosed in specification, by advancing "two-step" claim construction before district court without characterizing both steps as part of corresponding structure of that limitation, since competitor argued same or single concept before both courts; competitor's shift from "function" theory to "structure" theory on appeal was minor modification of claim scope in that equivalent structure infringed literally whereas equivalent function would have infringed under doctrine of equivalents. 35 U.S.C.A. § 112.

[7] **Courts 96(7)**
106k96(7) Most Cited Cases
Federal Circuit law controlled waiver in context of claim construction arguments, since ability to make claim construction arguments on appeal was intimately bound up with patent enforcement.

[8] **Federal Courts 611**
170Bk611 Most Cited Cases
An appellate court retains case-by-case discretion over whether to apply waiver.

[9] **Patents 324.1**
291k324.1 Most Cited Cases
Competitor's appeal of district court's denial of its motion for judgment as matter of law (JMOL) was not precluded, on theory of waiver, by competitor's failure to object to jury instructions on infringement, since "controlling law" was legal interpretation of asserted patent claims, and, thus, JMOL decision was based, irrespective of any jury instructions, on whether reasonable jury could have found that competitor infringed properly construed claims based on evidence presented. Fed.Rules Civ.Proc.Rule 50(a)(1), 28 U.S.C.A.

[10] **Federal Civil Procedure 2142.1**
170Ak2142.1 Most Cited Cases

[10] **Federal Civil Procedure 2608.1**
170Ak2608.1 Most Cited Cases
Judgment as a matter of law (JMOL) can be granted either before or after the jury has rendered a verdict, and it does not depend on how the jury was instructed; test is whether there is a legally sufficient basis for a reasonable jury to find for the non-moving party under the controlling law. Fed.Rules Civ.Proc.Rule 50(a)(1), 28 U.S.C.A.

[11] **Patents 101(8)**
291k101(8) Most Cited Cases
A computer-implemented means-plus-function term is limited to the corresponding structure disclosed in the specification and equivalents thereof, and the corresponding structure is the algorithm. 35 U.S.C.A. § 112.

[12] **Patents 101(8)**
291k101(8) Most Cited Cases
Corresponding structure for "time domain processing means," of patent directed toward way that wireless signals were processed through computer program, was microprocessor programmed to carry out two-step algorithm in which processor calculated generally non-discrete estimates and then selected discrete value closest to each estimate. 35 U.S.C.A. § 112.

[13] **Patents 229**
291k229 Most Cited Cases
Patent claim that recited method of using communication system could have been directly infringed only by one who used that system, not by one who made or sold components of system.

[14] **Patents 312(6)**
291k312(6) Most Cited Cases
Flow chart that described "simulation program" that competitor used for testing its algorithms did not establish that competitor directly infringed upon patent directed toward way that wireless signals were processed through computer program, since patent holder did not show that claimed method was actually carried out, rather than simulated, when competitor ran that program.

[15] **Patents 312(6)**
291k312(6) Most Cited Cases
Inference that competitor performed method of patent claim by testing its telephones before sale, due to large volume of sales of accused devices, did not constitute substantial evidence that competitor directly infringed upon that claim.

[16] **Patents 319(1)**
291k319(1) Most Cited Cases
Blended royalty rate could not be used when all of the infringement of the patent for which damages were available took place after lower rate came into effect; rate that should have been applied was one that would have been in effect during period for which damages were available.

[17] **Patents 324.60**
291k324.60 Most Cited Cases
Review of damages issues briefed by parties on appeal was warranted due to interests of judicial economy, despite remand on liability issue, since it was possible that identical issues would have arisen if infringement was found on remand.

[18] **Patents 319(1)**
291k319(1) Most Cited Cases
When considering the effective date of a reasonable royalty, consideration of a hypothetical negotiation on the date of first infringement is mandated, but evidence of subsequent events are not automatically excluded.

[19] **Federal Courts 773.1**
170Bk773.1 Most Cited Cases
A party does not invite error by taking a bold position at trial that later appears extreme or is abandoned as a matter of prudent appellate strategy.

[20] **Federal Courts 773.1**
170Bk773.1 Most Cited Cases
A party invites alleged error either by asking the trial court to make a ruling, the result of which the same party later challenged on appeal, or by failing to present cognizable arguments or evidence in favor of its position to the trial court.

[21] **Patents 312(8)**
291k312(8) Most Cited Cases
Infringement.
Substantial evidence supported jury's finding of willful patent infringement by competitor, where attorney, who was consulted by competitor to render opinion as to whether accused device infringed upon patent, could not confirm that any executive with decision-making authority in competitor's marketing or engineering departments had ever relied on opinion, it was unclear whether known recipients of opinion had any product or marketing responsibility, and jury could have concluded that information that competitor supplied to attorney contained false or misleading information about operation of accused device.

[22] **Patents 319(3)**
291k319(3) Most Cited Cases
District court did not abuse its discretion in deciding that enhanced damages award closer to legal maximum of treble damages was not warranted, for competitor's wilful infringement of patent, since court was free to take into account factors related to competitor's level of culpability, as well as other factors, and judge apparently concluded that competitor's willfulness was not highly culpable.

[23] **Patents 319(3)**
291k319(3) Most Cited Cases

[23] **Patents 325.11(5)**
291k325.11(5) Most Cited Cases
District courts have broad discretion in determining the amount of enhanced damages to award and in calculating attorney fees.

[24] **Patents 319(3)**
291k319(3) Most Cited Cases
District courts do not have to award enhanced damages at all, in spite of a finding of willful patent infringement, if the case presents reasons not to award them.

Patents 328(2)
291k328(2) Most Cited Cases
4,365,338. Construed.

Henry C. Bunsow, Howrey Simon Arnold & White, LLP, of San Francisco, California, argued for plaintiff-cross appellant. With him on the brief were Robert C. Laurenson, of Irvine, California, and Denise M. De Mory, of San Francisco, California. Of counsel on the brief were Raphael V. Lupo, Brian E. Ferguson and Natalia V. Blinkova, McDermott, Will & Emery, of Washington, DC; and Brett C. Govett, Fulbright & Jaworski L.L.P., of Dallas, Texas.

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Before CLEVENGER, GAJARSA, and PROST, Circuit Judges.

Opinion for the court filed by Circuit Judge PROST.

Dissenting opinion filed by Circuit Judge GAJARSA.

PROST, Circuit Judge.

Ericsson Inc. ("Ericsson") appeals from a judgment of infringement and award of damages by the United States District Court for the Northern District of Texas, Case No. 3:98-CV-2903, 2003 WL 21750710. Ericsson specifically appeals the district court's construction of claims 1, 2, 33, and 45 of U.S. Patent No. 4,365,338 ("the '338 patent"), the court's denial of its motion for judgment as a matter of law ("JMOL") of noninfringement of those claims, the jury's verdict of infringement, the amount of the remitted damages award, and the jury's verdict that Ericsson's infringement was willful. Harris Corporation ("Harris") cross-appeals the award of enhanced damages for willful infringement, characterizing it as too small. We vacate the district court's denial of JMOL of noninfringement of claims 1, 2, and 33 and remand for reconsideration of that issue in light of our interpretation of the claims. We reverse the denial of Ericsson's motion for JMOL of noninfringement of claim 45 and instruct the district court to enter judgment of noninfringement of that claim.

I. BACKGROUND

Ericsson manufactures and sells cellular communication equipment. Its products include both cellular phones and base stations, which receive, process, and transmit cellular signals. Both of these types of products are accused of infringing the '338 patent in the present case.

This patent concerns the way wireless signals are processed. Modern cellular devices transmit information in the form of bits of data grouped into packets, or "symbols." The symbols are transmitted by means of electromagnetic waves. Because the waves become distorted when they travel through the air and reflect off objects, the values of the symbols do not necessarily correspond to any of the allowed "discrete" values when they arrive at their destination. This effect is called "intersymbol interference." The receiving device typically uses a computer program to restore the symbols to their original discrete values.

The '338 patent specification describes such a program. In the disclosed process, the set of unknown symbols that represent the information to be transmitted is preceded and followed by sets of known symbols. Intersymbol interference affects all of the symbols, but since some of the symbols are known, the program can compare the received symbols to the known ones and thereby calculate the effect of the transmission medium. The program then applies what it learned about the effect of the medium to the distorted unknown symbols to derive "estimates" of their original values. The estimates are not discrete values, because the program's compensation for the effect of the medium is not perfect. Therefore, the program must convert the estimates into discrete values, which are called "decisions." The '338 patent thus discloses a two-step symbol decoding algorithm, the first step being the calculation of nondiscrete estimates and the second being the selection of discrete decisions based on the estimates.

Harris, a maker of defense communication equipment, owns the '338 patent. In the mid-1990s, Harris notified at least two cellular companies, Ericsson and Nokia, that it believed they were infringing certain Harris patents. At that time, Harris had not yet accused Ericsson of infringing the '338 patent specifically, but Nokia advised Ericsson to review that patent in late 1996. Ericsson proceeded to obtain an opinion from a patent attorney, John Lastova, that stated that Ericsson did not infringe the '338 patent. On August 17, 1998, Harris sued Ericsson for infringement of the ' 338 patent (among others) in the Northern District of Texas.

A special master construed terms in claims 1, 2, 33, and 45 of the '338 patent, and the district court adopted the special master's construction. Claim 1, from which claims 2 and 33 depend, reads as follows, with passages relevant to this appeal underlined:

> A communication system for communicating information signals from a transmitting station to a receiving station over a dispersive medium, comprising:
> transmitting apparatus, disposed at said transmitting station, for transmitting information signals interleaved with known signals; and
> receiving apparatus, disposed at said receiving station, for receiving the transmitted signals subject to the influence of said dispersive medium and providing estimates of the originally transmitted information signals, said receiving apparatus comprising:
> means for generating a replica of said known signals,
> *time domain processing means* for simulating the time domain effect of said dispersive medium on signals transmitted through it by deducing prescribed characteristics of said medium, and *for producing estimates of said information signals in accordance with a preselected relationship between said prescribed characteristics of said simulated effect and said known and received*

signals, and
output conversion means, coupled to said processing means, for converting said estimates of said information signals into output signals representative of the original information signals at said transmitting station.
'338 patent, col. 17, II. 42-66 (emphasis added).

The parties disputed whether these claims were limited to a two-step process for dealing with intersymbol interference. In Ericsson's view, these claims only covered systems that performed a first step of calculating nondiscrete estimates, followed by a second step of selecting discrete decisions. Harris contended that these claims covered both one-step and two-step processes, one-step processes being those that directly obtain discrete values without an intermediate step of calculating nondiscrete estimates. This dispute was relevant to infringement, because Ericsson's accused products employ a process that does not have a step of calculating nondiscrete estimates. This process is known as Maximum Likelihood Sequence Estimation using the Viterbi Algorithm, or "Viterbi MLSE." In Viterbi MLSE, the receiving device compares distorted sequences of received symbols to hypothetical sequences of transmitted symbols to find the sequence of symbols that was most likely transmitted. The hypothetical sequences are distorted in accordance with a model of the transmission medium.

The court construed claims 1, 2, and 33 under 35 U.S.C. § 112 ¶ 6. A § 112 ¶ 6 limitation covers an accused product that has a function identical to the one recited in the claim and a structure that is identical or equivalent to the corresponding structure disclosed in the patent. 35 U.S.C. § 112 ¶ 6 (2000). The court held that the corresponding structure for the "time domain processing means" limitation was the "symbol processor 37." Accordingly, the court rejected Ericsson's contention that the claims were limited to a two-step process and instructed the jury that these claims covered "a one or two-step process." Under this claim construction and jury instruction, an infringing system need not perform two separate steps of calculating nondiscrete estimates and deriving discrete decisions; a system that compensated for intersymbol interference to produce discrete results in one step could still infringe these claims literally.

Claim 45, a method claim, was also asserted:
A communication scheme for communicating information symbols from a transmitting station to a receiving station, said information symbols being originally unknown at said receiving station, over a dispersive medium, comprising the steps of:
transmitting, from said transmitting station, said information symbols interleaved with additional symbols, said additional symbols being known at the receiving station;
receiving, at said receiving station, the interleaved known and unknown symbols transmitted from said transmitting station over said dispersive medium;
generating, at said receiving station, a replica of said known symbols; and
processing the symbol values received at said receiving station by simulating the effect of said dispersive medium by generating an equalization function defining the dispersive characteristics of said medium and *producing, as estimates of said information symbols, those information symbols capable of being transmitted which are closest to information symbols the values of which minimize the sum of the squares of the magnitudes of successive pluralities of noise signals corresponding to received information and known symbols,* calculated in accordance with the prescribed relationship between said simulated effect and said known and received symbol values.
'338 patent, col. 25, II. 3-31 (emphasis added). The court held that claim 45, like the other claims at issue, was not limited to a two-step process but also covered one-step processes.

The case proceeded to a jury trial on these four claims. The jury found that Ericsson infringed claims 1 and 33 literally and claims 2 and 45 under the doctrine of equivalents. The jury also found that reasonable royalty damages amounted to $61,250,000. This amount was premised on a 1.75% royalty rate on Ericsson's allegedly infringing sales from the date it received notice of the '338 patent, August 17, 1998, to the date the patent expired, June 27, 2000. [FN1] Harris's damages expert, Walter Bratic, identified 1.75% as the royalty rate to which the parties would have agreed in a hypothetical license negotiation on January 1, 1992, the date Ericsson began its allegedly infringing activity. Bratic also testified that this negotiation would have yielded a five-year license agreement that would have been renewed on January 1, 1997 at a royalty rate of 0.5%. The jury also found that Ericsson's infringement was willful.

In response to Ericsson's motion for JMOL, the district court upheld the verdict in all respects except the amount of damages. The court held that the evidence could not support the jury's reasonable royalty damages award. The court interpreted *Wang Laboratories, Inc. v. Toshiba Corp.,* 993 F.2d 858 (Fed.Cir.1993), as requiring the hypothetical negotiation to have occurred on the date of first infringement, but not precluding the modification of the royalty rate over time by subsequent events. The court gave Harris the choice between a remitted award of $43,270,150 and a new trial. To arrive at this royalty, which the court characterized as the highest amount the jury could have awarded under applicable law, the court averaged the 1.75% and 0.5% rates, weighting each by the number of days of infringement that passed in the period in which each rate applied. Accordingly, the court weighted the 1.75% rate by 1,826 days (January 1, 1992 to December 31, 1996) and the 0.5% rate by 1,274 days (January 1, 1997 to June 27, 2000), resulting in a blended rate of 1.24%. The court then applied this rate to Ericsson's $3.5 billion in sales in the statutory damages period, exactly as the jury had done with the higher royalty rate, to arrive at the final figure. Harris accepted the remitted award, and the court entered judgment on the jury verdict and awarded damages, including an additional $1,000,000 in enhanced damages and $1,034,930 in attorneys' fees based on the jury's willfulness finding.

II. DISCUSSION

Ericsson filed a timely appeal to this court in which it challenges the district court's claim construction, requests reversal of the denial of Ericsson's motion for JMOL of noninfringement, seeks a remittitur of the reasonable royalty damages to $17,500,000 if there is infringement, and asks for reversal of the jury's finding of willful infringement. Harris filed a timely cross-appeal on the magnitude of the enhanced damages award. We have jurisdiction under 28 U.S.C. § 1295(a)(1).

A. Standards of Review

[1] The district court's claim construction is reviewed de novo. *Laitram Corp. v. NEC Corp.,* 62 F.3d 1388, 1392 (Fed.Cir.1995). As explained below, however, there is a dispute over whether Ericsson is barred by estoppel or waiver from asserting the claim interpretation it puts forth in this appeal.

[2][3] We review the court's denial of a motion for JMOL de novo. A court may grant JMOL on an issue when "there is no legally sufficient evidentiary basis for a reasonable jury to find for [the nonmoving] party on that issue ...." Fed.R.Civ.P. 50(a)(1). The denial of JMOL is not a patent-law-specific issue, so regional circuit law applies. The United States Court of Appeals for the Fifth Circuit describes appellate review of a JMOL denial as a determination whether "the facts and inferences point so strongly and overwhelmingly in favor of one party that the court concludes that reasonable jurors could not arrive at a contrary verdict." *Bellows v. Amoco Oil Co.,* 118 F.3d 268, 273 (5th Cir.1997).

[4][5] In reviewing the district court's award of reasonable royalty damages, we must determine if the court abused its discretion in its methodology for calculating the royalty. *SmithKline Diagnostics, Inc. v. Helena Lab. Corp.,* 926 F.2d 1161, 1164 (Fed.Cir.1991). An abuse of discretion occurs when a court bases its determination "on clearly erroneous factual findings, legal error, or a manifest error of judgment." *Datascope Corp. v. SMEC, Inc.,* 879 F.2d 820, 823-24 (Fed.Cir.1989) (citation omitted). The district court's award of enhanced damages for willful infringement is also reviewed under an abuse of discretion standard, and the jury's underlying factual finding of willfulness is reviewed for substantial evidence. *Johns Hopkins Univ. v. CellPro, Inc.,* 152 F.3d 1342, 1354 (Fed.Cir.1998).

B. Claim Construction

[6] We address the system claims (1, 2, and 33) and the method claim (45) separately, because they present different claim construction and infringement issues.

1. The Parties' Arguments

As the district court correctly held, the "time domain processing means" limitation of claims 1, 2, and 33 falls under 35 U.S.C. § 112 ¶ 6. It includes the word "means," thereby invoking a presumption that § 112 ¶ 6 applies, and it does not recite sufficient structure for performing the claimed function to rebut the presumption. The parties agree on these points. Their dispute is over the corresponding structure of the "time domain processing means." The district court held that the corresponding structure was a "symbol processor." Because the district court was unaware of our decision in *WMS Gaming, Inc. v. International Game Technology,* 184 F.3d 1339 (Fed.Cir.1999), it did not limit the scope of claims 1, 2, and 33 to a particular algorithm. Instead, the court instructed the jury in general that these claims covered "a one or two-step process." Ericsson challenges this holding on appeal, asserting that this court's precedent requires the corresponding structure of a computer-implemented function to be more than just hardware--that the disclosed algorithm constitutes part of the corresponding structure as well. Harris appears not to disagree with this general statement of the law, but it claims that Ericsson's current argument is foreclosed by waiver or estoppel and that the district court's jury instruction that the claims could cover a one-step process does not violate the algorithm rule.

Ericsson takes the position that this case falls squarely under the rule of WMS Gaming, which established that the corresponding structure for a § 112 ¶ 6 claim for a computer-implemented function is the algorithm disclosed in the specification. 184 F.3d 1339 (Fed.Cir.1999). In Ericsson's view, the algorithm in the '338 patent includes two steps: calculating nondiscrete estimates, and then converting those estimates to discrete decisions. Under this construction, Ericsson maintains that the infringement verdict is unsustainable. Ericsson seeks an order directing the district court to enter judgment of noninfringement.

Harris's primary response is that Ericsson waived the WMS Gaming argument by failing to advance it at trial and arguing instead that the two-step limitation was part of the function of the claimed "time domain processing means." If that were not enough to effect a waiver, Harris says, Ericsson would nonetheless have waived the construction it currently advocates by failing to object to the district court's jury instructions or to proffer curative instructions. Harris contends that waiver precludes this court from even entertaining Ericsson's claim construction appeal, or at least that we must apply the Fifth Circuit's deferential "plain error" standard of review to the district court's construction. *See* Taita Chem. Co. v. Westlake Styrene, 351 F.3d 663, 668 (5th Cir.2003) ("If error is not preserved, we review for plain error. To meet this standard, a party must show: (1) that an error occurred; (2) that the error was plain, which means clear or obvious; (3) the plain error must affect substantial rights; and (4) not correcting the error would seriously affect the fairness, integrity, or public reputation of judicial proceedings." (Internal quotation marks omitted.)). If waiver does not apply, Harris's alternative position is that WMS Gaming only establishes that the corresponding structure of a computer-implemented function must include those features of the algorithm that are necessary to the performance of the recited function--not that every detail of the specification's algorithm is a limitation on the claimed invention, which is how Harris characterizes Ericsson's asserted claim construction. Harris asserts that the two-step process cannot be divorced from equation (7) in the specification, and it stresses that Ericsson has conceded that equation (7) is not a limitation on the scope of the asserted claims. Just like equation (7), Harris argues, the two-step process is merely an optional feature of the invention, an example of how to implement the claimed function. On this basis, Harris contends that the court's jury instruction does not violate the WMS Gaming rule because the disclosed algorithm is optionally one-step or two-step. Finally, Harris refuses to concede noninfringement even under Ericsson's proposed construction; in the event that we reverse the district court's claim construction, Harris believes it is still entitled to judgment of infringement because substantial evidence supports the proposition that features of Ericsson's accused system are structurally equivalent under § 112 ¶ 6 to a two-step algorithm.

The only reasoned argument Harris presents for an outright affirmance of the district court's "symbol processor" claim construction (as opposed to a modification of the district court's construction to require an algorithm, but one that could have either one or two steps) is that waiver or estoppel bars Ericsson from raising its current arguments. The district court held that the corresponding structure was simply a microprocessor, specifically the symbol processor shown as reference numeral 37 in Figure 4 of the '338 patent. Harris purports to argue that the district court's construction is correct, but Harris never justifies considering the corresponding structure to be the processor alone and not also the algorithm according to which it is programmed. In fact, Harris implicitly acknowledges that the law requires something more than just a microprocessor as corresponding structure; the gist of Harris's argument is that the corresponding structure does include an algorithm, but not the one Ericsson identifies. According to Harris, the algorithm advocated by Ericsson either does not correspond to claims 1, 2, and 33 or constitutes an improperly narrow understanding of the disclosed algorithm. In short, both Ericsson and Harris effectively acknowledge on appeal that the corresponding structure of a microprocessor-implemented function is not only the microprocessor, but also the algorithm implemented by the microprocessor. On the merits of the claim construction issue, the parties dispute what the algorithm is, not whether it is required.

2. Waiver and Estoppel--Choice of Law

[7] Because waiver and estoppel are the only available grounds on which to affirm the district court's construction, we first consider whether Ericsson waived, or is estopped from asserting, any of its claim construction arguments based on its actions before the district court. Waiver is a procedural issue, but if one views the issue more

narrowly as "waiver of a claim construction argument," rather than the more general "waiver of an appellate argument," it seems indisputably unique to patent law. In our estimation, the narrower of these two views is more appropriate. This court does not appear to have addressed explicitly the choice of law issue presented here, but numerous Federal Circuit cases have discussed waiver of claim construction arguments, citing Federal Circuit law without so much as mentioning regional circuit law. *See, e.g., Gaus v. Conair Corp.,* 363 F.3d 1284, 1287-88 (Fed.Cir.2004); *Interactive Gift Express, Inc. v. Compuserve Inc.,* 256 F.3d at 1346, 1344-47 (Fed.Cir.2001); *Key Pharms. v. Hercon Labs. Corp.,* 161 F.3d 709, 714-16 (Fed.Cir.1998); *Sage Prods., Inc. v. Devon Indus.,* 126 F.3d 1420, 1426 (Fed.Cir.1997). Also, we have held that "waiver of claims and defenses in a settlement agreement," where "the underlying substance of these arguments ... is intimately related with the substance of enforcement of a patent right[,]" is a matter of Federal Circuit law. *Flex-Foot, Inc. v. CRP, Inc.,* 238 F.3d 1362, 1365 (Fed.Cir.2001). Because the ability to make claim construction arguments on appeal is intimately bound up with patent enforcement, we hold that Federal Circuit law controls waiver in the context of claim construction arguments.

3. Waiver--Analysis

The initial step in our waiver analysis is to compare Ericsson's appellate and trial court arguments. Harris alleges that Ericsson never argued in front of the district court for the two-step claim construction it advances now. Ericsson argues that its positions before the district court were basically the same as the ones it maintains now. Neither side is entirely correct. Ericsson's claim construction brief to the district court shows that it did indeed advance a "two-step" claim construction, but on a different theory than that on which its appeal is premised. Ericsson contended in its claim construction brief that selecting discrete decisions is a required step separate from the function of the "time domain processing means," which is to produce nondiscrete "estimates of the originally transmitted information signals." Ericsson also proposed an alternative construction in which the function of the "time domain processing means" is to implement a two-step algorithm. This argument evidences a requirement of two steps, but Ericsson never characterized both steps as part of the corresponding structure of that limitation. Thus, Ericsson's claim construction theory on appeal is at least slightly different--in form if not in ultimate conclusion--from its position below.

[8] The next question is whether the change in Ericsson's argument is so insubstantial that it represents "the same concept" that Ericsson raised before the district court, in which case there would be no waiver. *See Gaus,* 363 F.3d at 1288. An appellate court retains case-by-case discretion over whether to apply waiver. *Singleton v. Wulff,* 428 U.S. 106, 120, 96 S.Ct. 2868, 49 L.Ed.2d 826 (1976); *Interactive Gift,* 256 F.3d at 1344. *Gaus* provides a useful guide to the exercise of that discretion. In *Gaus,* the appellant had argued prior to trial that a "pair of probe networks" in a hair dryer's automatic shut-off mechanism for preventing electrical shocks in bathtubs required

> two corresponding things designed for use together the functioning of which are independent of the other voltage carrying portions of the hairdryer to be protected and which are configured such that the trigger switch current will respond before the penetrating water reaches any other voltage carrying portions of the hairdryer, such as the heating coil.

Id. On appeal, the appellant changed its phrasing to "a pair of probe networks that is separate and operates independently from any voltage carrying part of the apparatus and which will effect a current shut off (upon entry of water) before water touches any voltage carrying part of the apparatus." *Id.* The court in that case articulated a single concept that these two phrasings expressed: "that the probe network must contain two conductive elements that are separate or independent from the voltage-carrying portions of the hairdryer." *Id.* Such a characterization applies to the present case, too: Ericsson's claim construction now, as it was before the district court, is that the asserted claims require a two-step algorithm of producing nondiscrete estimates and deriving discrete decisions therefrom. Thus, we conclude that Ericsson is arguing "the same concept" as it argued before the district court.

It strains credulity for Harris to argue that Ericsson is raising a wholly new claim construction on appeal. Ericsson could not have stated any more clearly before the district court that it was advocating a two-step claim construction; the only difference between its district court and appellate arguments hinges on whether the two steps are found in the claimed functions or the corresponding structure. The slight change in claim scope that results from Ericsson's alteration of the rationale for its claim construction does not affect our view in this case. Shifting from a "function" theory to a "structure" theory modifies the claim scope in one minor way: equivalent structure infringes literally (as long as the equivalent structure was a technology that was available prior to the issue date of the patent), whereas an equivalent function would infringe under the doctrine of equivalents. *See Interactive Pictures Corp. v. Infinite Pictures, Inc.,* 274 F.3d 1371, 1382 (Fed.Cir.2001); *Al-Site Corp. v. VSI Int'l, Inc.,* 174 F.3d 1308, 1320 (Fed.Cir.1999). This change is not significant enough to bring the case outside the "same concept" rule of *Gaus.* We have been presented with no argument that this technical distinction in the type of infringement makes any practical difference in this case. Because Ericsson is advocating the same concept as it did in the district court, we hold that Ericsson's district court claim construction arguments do not preclude its *WMS Gaming* argument on appeal. [FN2]

[9][10] Harris argues that another basis for applying waiver is Ericsson's failure to object to the jury instructions on infringement. We disagree, because Ericsson has appealed the district court's denial of JMOL. JMOL can be granted either before or after the jury has rendered a verdict, and it does not depend on how the jury was instructed. The test is whether there is a legally sufficient basis for a reasonable jury to find for the nonmoving party "under the controlling law[.]" Fed.R.Civ.P. 50(a)(1). The longstanding test for appeals of the denial of JMOL under Fifth Circuit law is whether the evidence presented can suffice, as a matter of law, to support a jury verdict, and "review of [a] JMOL-denial is not restricted to the law as stated in the jury instructions." *Arsement v. Spinnaker Exploration Co.,* 400 F.3d 238, 248 (5th Cir.2005); *cf. Koito Mfg. Co. v. Turn-Key-Tech, LLC,* 381 F.3d 1142 (Fed.Cir.2004) (in an appeal of a denial of a motion for a new trial, precluding an appellant's claim construction argument that was not raised in objections to jury instructions). Here, the "controlling law" is the legal interpretation of the asserted claims. Thus, irrespective of any jury instructions, the JMOL decision is based on whether a reasonable jury could find that Ericsson infringed the properly construed claims based on the evidence presented. [FN3]

4. Construction of Claims 1, 2, and 33

[11][12] Turning to the substantive claim construction issue, *WMS Gaming* restricts computer-implemented means-plus-function terms to the algorithm disclosed in the specification. Construing the term "means for assigning a plurality of numbers representing said angular positions of said reel, said plurality of numbers exceeding said predetermined number of radial positions such that some rotational positions are represented by a plurality of numbers[,]" the court in *WMS Gaming* rejected the argument that the corresponding structure was merely "an algorithm executed by a computer," holding instead that it was limited to the specific algorithm disclosed in the specification. *WMS Gaming,* 184 F.3d at 1348-49. The specification's algorithm resembled the functional language "assigning a plurality of numbers ..." in the claim itself and this court ultimately relied on that functional limitation to hold that there was no infringement. *Id.* at 1352. On that basis, Harris argues that this court's construction in *WMS Gaming* was merely a restatement of the function, not a legal holding that means-plus-function claims involving a microprocessor are always limited to the disclosed algorithm. We do not read *WMS Gaming* to be so limited. The *WMS Gaming* court could have relied on the function to limit the claim, but explicitly based the claim construction portion of its ruling on structure instead. *Id.* at 1348-49. A computer-implemented means-plus-function term is limited to the corresponding structure disclosed in the specification and equivalents thereof, and the corresponding structure is the algorithm.

Ericsson is correct that *WMS Gaming* applies to the means-plus-function claims in this case. Like the claim in *WMS Gaming,* Harris's claim 1 includes a means-plus-function limitation implemented by a microprocessor. Specifically, it recites a

> time domain processing means for simulating the time domain effect of said dispersive medium on signals transmitted through it by deducing prescribed characteristics of said medium, and for producing estimates of said information signals in accordance with a preselected relationship between said prescribed characteristics of said simulated effect and said known and received signals.

The district court did not have the benefit of briefing on *WMS Gaming,* but this precedent establishes that corresponding structure of the "time domain processing means" cannot be merely a "symbol processor," as the district court held. The "symbol processor" construction does not incorporate any disclosed algorithm. We hold that the corresponding structure for the "time domain processing means" is a microprocessor programmed to carry out a two-step algorithm in which the processor calculates generally nondiscrete estimates and then selects the discrete value closest to each estimate. Specifically, the patent discloses, as corresponding structure, a processor 37, "advantageously comprised of a pair of processors--a support processor (SUPP) [37A] and a fast array processor (FAP) [37B,]" shown in Figure 4 and described at col. 11, l. 37--col. 12, l. 32, which is programmed to carry out the disclosed "data recovery algorithm" illustrated in Figures 8A, 8B, and 9 and described at col. 7, l. 18--col. 8, l. 38; col. 13, l. 45--col. 14, l. 20; and col. 15, l. 2-- col. 16, l. 11. Processor 37A carries out the first part of the algorithm: calculating the effect of the medium and applying it to the received symbols. '338 patent, col. 15, ll. 2-6. Processor 37B "examines the ... estimates and compares these codes with those corresponding to the code values capable of being transmitted." *Id.* col. 15, ll. 13-17. Thus, each processor performs one of the steps.

Aspects of this algorithm can vary based on implementation, as the specification implies. For example, the algorithm need not be applied to "an eight-ary PSK transmission scheme"; this is an "illustration of the effect of [the] thus-far described decision process as applied" to such a transmission scheme. *Id.* col. 15, ll. 27-29. The same "decision process" could be applied to another type of transmission scheme. Likewise, as Ericsson concedes, the corresponding structure of the "time domain processing means" is not limited to Equation (7) disclosed in column 8, line 30 of the patent. However, the specification characterizes the two-step process as "the invention," not merely an implementation of the invention. *See id.* col. 5, ll. 50-55; col. 7, ll. 18-27. Thus, we reject Harris's argument that the disclosed algorithm is broad enough to literally encompass one-step processes. [FN4]

Figure 9 illustrates how this algorithm is implemented. In Figure 9, the point labeled "A" represents the received symbol value. *See id.* col. 15, ll. 31-33. The point labeled "<<triangle>>B" represents the estimate obtained from the matrix calculations performed by processor 37A. The algorithm then involves the further step of choosing the allowed value that is closest to the estimate. In Figure 9's example, this closest discrete value is 010. *Id.* col. 15, ll. 37-39.

Thus, the district court erred in holding that claims 1, 2, and 33 can cover systems that implement either a one-step or two-step process. The corresponding structure limits the "time domain processing means" to a two-step algorithm in which the processor calculates generally nondiscrete estimates and then selects the discrete value closest to each estimate, or structural equivalents thereof.

5. Infringement of Claims 1, 2, and 33

Having adopted Ericsson's construction, we are nonetheless unable to conclude that it mandates judgment in Ericsson's favor on claims 1, 2, and 33. Harris refuses to concede that Ericsson's accused system lies outside the scope of a two-step claim. Harris, in fact, argues that even under this claim construction we should affirm the judgment of infringement because substantial evidence demonstrates that Ericsson's device infringes under § 112 ¶ 6 because its one-step Viterbi MLSE algorithm is equivalent to the corresponding structure of the "time domain processing means." Such evidence, according to Harris, includes testimony by Ericsson's expert that one-step and two-step symbol decoding processes perform the same function--producing estimates; testimony by a Harris expert and a '338 patent inventor that a one-step Viterbi algorithm and the two-step process involving equation (7) disclosed in the patent are both "MLSE shortcuts that dramatically reduce the number of hypotheses that have to be tested"; testimony by the same two individuals that both of these processes "select, as the most likely hypothesis, the hypothesis that minimizes the sum of the squares of successive noise values assumed added to the sequence"; and testimony by Ericsson's expert that the second step of selecting discrete decisions is "fairly simple." In response, Ericsson cites testimony by Harris's aforementioned expert and inventor that the disclosed two-step process is not a form of MLSE, and Ericsson also contends that Viterbi MLSE would not have been feasible in the long-distance communication applications for which the '338 patent was designed because it is too slow to deal with the large amount of intersymbol interference that arises in those applications.

We are unwilling to decide the issue of § 112 ¶ 6 equivalence in the first instance in this appeal. Also, the parties did not fully brief the issue of structural equivalence of one-step and two-step processes before the district court. *See Ecolab, Inc. v. Envirochem, Inc.*, 264 F.3d 1358, 1369 (Fed.Cir.2001). Rule 50(d), which governs the denial of a motion for JMOL, is apposite: "If the appellate court reverses the judgment, nothing in this rule precludes it from determining that the appellee is entitled to a new trial, or from directing the trial court to determine whether a new trial shall be granted." Fed.R.Civ.P. 50(d). As permitted by Rule 50(d), we remand the issue of infringement of claims 1, 2, and 33 to the district court for further proceedings consistent with the claim construction adopted herein, including a determination of whether a new trial should be granted.

6. Construction of Claim 45

The parties dispute whether claim 45 is limited to a two-step process. The district court held that it was not. Each side argues that the plain language of claim 45 supports its interpretation. Ericsson says that a first step of generating nondiscrete estimates (as that term is used in the written description) is required because the claim indicates that such estimates are "calculated in accordance with" the simulated effect of the medium. Harris responds that the calculated "information symbols the values of which minimize the sum of the squares ..." need not be nondiscrete values, particularly emphasizing Ericsson's expert's opinion that "closest to" means "not necessarily equal." Harris characterizes this statement as an implicit admission that "closest to" includes "equal to," so the discrete "estimates" (as that term is used in claim 45) can be identical to the "information symbols the values of which minimize the sum of the squares ...." If those two sets of symbols can be identical, then there is no first step that produces nondiscrete values, and the claim covers a one-step process.

We decline to resolve this dispute because it is immaterial to the disposition of the present appeal. For reasons discussed below, Ericsson has not directly infringed claim 45, even under Harris's preferred construction. In addition, there is no claim of indirect infringement currently pending, because the district court denied Harris's motion to amend its complaint to include indirect infringement allegations. Accordingly, any decision we could make on claim construction would not change the result for claim 45.

7. Infringement of Claim 45

[13][14][15] The parties dispute whether substantial evidence supports the verdict that Ericsson committed direct infringement of claim 45. Ericsson argues that, at most, it contributes to or induces infringement by its customers, and that no evidence in the record can support a verdict of direct infringement by Ericsson.

Harris again argues for waiver based on jury instructions. Harris asserts that the sufficiency of the evidence must be evaluated in light of those instructions, which were phrased in terms of whether the claim limitations were found in the accused products, not whether Ericsson practiced the method. Under these instructions, Harris says, it is irrelevant to the sufficiency of the evidence whether Ericsson or its customers practiced the method. In Harris's view, the jury answered the question presented to it, and on that basis found Ericsson liable for infringement. Harris asserts that Ericsson waived its right to appeal the direct infringement issue when it failed to object to these jury instructions.

However, Ericsson's argument that jury instructions are irrelevant to a motion for JMOL is as applicable to claim 45 as it was to claims 1, 2, and 33. Ericsson requested JMOL from the district court on the basis that no evidence could convince a reasonable jury that it directly infringed claim 45 under the controlling law of direct infringement. Accordingly, Ericsson has not waived its right to argue that no evidence shows direct infringement on the merits.

In fact, no evidence shows direct infringement. Claim 45 recites a method of using a communication system, and it can therefore be directly infringed only by one who uses the system, not by one who makes or sells the components of the system. The only purported evidence of Ericsson's direct infringement that Harris cites in its brief is a flow chart describing a "simulation program" that Ericsson uses for testing its algorithms. Harris has not shown that the claimed method is actually carried out, rather than simulated, when Ericsson runs this program. The only other argument Harris presented for infringement of claim 45 was that Ericsson's large volume of sales of the accused devices constituted circumstantial evidence from which we should infer that Ericsson performed the method of claim 45 by testing its phones before sale. [FN5] Such an inference does not substitute for substantial evidence that Ericsson directly infringed claim 45. We do not find substantial evidence to support this claim in the record.

Accordingly, we vacate the jury's verdict of direct infringement of claim 45. As mentioned in Part 6, the district court already precluded Harris from amending its complaint to allege indirect infringement, so we reverse the district court's denial of Ericsson's motion for JMOL on claim 45 and instruct the district court to enter judgment of noninfringement of claim 45.

C. Damages

1. Reasonable Royalty

[16][17][18] We next turn to damages. While our conclusion with regard to infringement obviates the need to reach this issue at this time, it is possible that the identical issues will arise if infringement is found on remand. Thus, for purposes of judicial economy, we review the damages issues briefed by the parties in this appeal. [FN6]

Bratic's reasonable royalty testimony presented the district court with two rates: a 1.75% rate that would have applied to a five-year license beginning on January 1, 1992, and a 0.5% renewal rate beginning on January 1, 1997. The district court's blended rate represents a middle ground between these two.

Harris argued at trial that *Wang* forecloses consideration of events occurring after the date of first infringement. The parties agree that the start date of infringement, if any, was January 1, 1992. Harris is now satisfied with the result of the district court's blending, even though it involves consideration of later negotiations, because it "does not exceed the maximum allowable recovery and should be sustained." However, to justify its characterization of 1.75% as the rate behind the "maximum allowable recovery," Harris continues to assert that *Wang* ties the royalty rate to the date of first infringement, regardless of subsequent events that would have occurred. Harris emphasizes this court's statement in *Wang* that "negotiations should have been hypothesized at the start of infringement, i.e., when both a patent had issued and accused products were sold." 993 F.2d at 869.

Ericsson relies on the undisputed fact that the statutory damages period did not begin until it received notice of the patent on August 17, 1998. It contends that the pre-1997 royalty rate is irrelevant, because no damages were available during that period. According to Ericsson, nothing in *Wang* precludes reliance on events subsequent to a first hypothetical negotiation, so long as that negotiation is considered to have taken place on the date of first infringement.

We agree in part with the district court's analysis of our precedent on the effective date of a reasonable royalty. The court correctly understood *Wang* as mandating consideration of a hypothetical negotiation on the date of first infringement but not automatically excluding evidence of subsequent events. Where we part company with the district court is over the understanding that it is permissible to use a blended royalty rate when all of the infringement for which damages are available took place after the lower rate would have come into effect. To the best of our knowledge, this issue is one of first impression for this court. We conclude that the rate to apply is the one that would have been in effect during the period for which damages are available. In reversing the district court's legal interpretation, we necessarily conclude that the court abused its discretion.

The highest royalty rate that the evidence supports for the 1998-2000 damages period is 0.5%, the rate at which Bratic testified the parties would have renewed their license in 1997. Assuming that the royalty rate did not depend on whether all four, or fewer than four, of the asserted claims were infringed-- and nothing in the record leads us to believe that it did so depend--then 0.5% is the applicable royalty rate, should infringement be found on remand. *See Knight v. Texaco, Inc.,* 786 F.2d 1296, 1299-1300 (5th Cir.1986) (reviewing a remitted damages award to determine whether it "exceeds the maximum amount that the trier of fact could have properly awarded"). [FN7] The parties agree that the royalty base for the 1998-2000 damages period is $3.5 billion, so reasonable royalty damages would be $17,500,000.

Harris's claim that Ericsson "invited" the erroneously high damages award is not supported by the case law. Harris essentially contends that Ericsson was responsible for the jury's choice of a 1.75% royalty rate because Ericsson's asserted alternatives, 0.0584% or 0.0439%, were "indefensibly low." Even if these rates are indefensibly low, the cases cited by Harris do not imply that Ericsson invited the error. In *Chemical Engineering Corp. v. Essef Industries,* 795 F.2d 1565 (Fed.Cir.1986), the plaintiff "never accused a specific ... device of infringement" and so could not be heard to complain of a grant of summary judgment of noninfringement. *Id.* at 1572. In *Weinar v. Rollform Inc.,* 744 F.2d 797 (Fed.Cir.1984), Rollform proposed the submission of fact interrogatories to the jury, and Weinar successfully objected. When Weinar reversed itself and challenged the omission of fact interrogatories as prejudicial, the court accused Weinar of inviting the error. *Id.* at 809. *Hidden Oaks v. City of Austin,* 138 F.3d 1036 (5th Cir.1984), is similar: having objected when its opponent attempted to cross-examine a witness on the value of an apartment complex, a party could not assert that district court erred by not permitting the witness to testify on that issue. *Id.* at 1051. *Sierra Club v. Yeutter,* 926 F.2d 429 (5th Cir.1991), precluded the government from arguing against the standard of review the government itself had encouraged the trial court to adopt. *Id.* at 438. Finally, this court looked disapprovingly on an appellant's attempt to overturn the very claim construction it had advocated at trial in *Key Pharmaceuticals,* 161 F.3d at 715.

[19][20] In each of these cases, a party invited an alleged error either by asking the trial court to make a ruling, the result of which the same party later challenged on appeal, or by failing to present cognizable arguments or evidence in favor of its position to the trial court. That situation is not present

here. Taking a bold position at trial that later appears extreme or is abandoned as a matter of prudent appellate strategy does not, without more, invite error.

2. Willful Infringement

[21] Substantial evidence supports the jury's finding of willfulness on the part of Ericsson. We review this issue here because, like the reasonable royalty, it will arise again if Ericsson is found to infringe under the two-step claim construction. Additionally, our modification of the claim construction has no effect on the willfulness issue, because the willfulness determination could reasonably have been based on issues that, on the particular facts of this case, are independent of the claim construction dispute on appeal: the basis for the Lastova opinion and Ericsson's reliance on it. *See generally* Read Corp. v. Portec, Inc., 970 F.2d 816, 828-29 (Fed.Cir.1992) ("Those cases where willful infringement is found despite the presence of an opinion of counsel generally involve situations where opinion of counsel was either ignored or found to be incompetent."). At trial, Lastova could not confirm that any executive with decision-making authority in Ericsson's marketing or engineering departments had ever relied on the opinion. Also, Ericsson does not contest Harris's assertion that it is unclear whether the known recipients of the opinion, two in-house attorneys, had any product or marketing responsibility. While the responsibilities of those who received the opinion are not dispositive of whether Ericsson "ignored" the opinion, the evidence does suggest that little, if any, attention was given to the document within Ericsson. Other evidence undermines the foundations of the opinion. The jury could have concluded that the information Ericsson supplied to Lastova, in the form of a memo prepared by two Ericsson engineers, contained false or misleading information about the operation of Ericsson's products. The memo, on which Lastova relied, contained questionable factual assertions, such as a contention that Ericsson's products do not compensate for distortion in received information. Additionally, Lastova admitted that, contrary to his usual practice when offering an opinion on infringement issues, he did not obtain documentation from Ericsson on how the accused products work, except for the memo that Ericsson specifically prepared for his use in drafting his opinion.

This evidence provided the jury with some basis for believing that Ericsson ignored the opinion of counsel it received regarding the '338 patent; that the opinion was simply a rehashing of Ericsson's own internal conclusions on noninfringement, without independent verification by opinion counsel; and that Ericsson failed to convey accurate information to its opinion counsel. Were we sitting as triers of fact, we might not have come to the same conclusion, but on a substantial evidence standard of review we do not see a basis to overturn the jury's finding of willfulness.

3. Amount of Enhanced Damages (Cross-Appeal)

[22][23][24] In awarding the consequent enhanced damages, the district court did not abuse its discretion. In so holding, we reject Harris's contention on cross-appeal that the $1 million enhanced damages award was too small. District courts have broad discretion in determining the amount of enhanced damages to award and in calculating attorney's fees. Indeed, they do not have to award such damages at all, in spite of a finding of willfulness, if the case presents reasons not to award them. *Jurgens v. CBK, Ltd.,* 80 F.3d 1566, 1570-72 (Fed.Cir.1996). While the court's $1 million enhanced damages award is small compared to the legal maximum of treble damages, a court is free to take into account factors related to the defendant's level of culpability, as well as other factors. *See* Read Corp., 970 F.2d 816. The trial judge apparently concluded that Ericsson's willfulness was not highly culpable. We are satisfied that the judge properly exercised her discretion in deciding that an enhanced damages award closer to the legal maximum was not warranted.

III. CONCLUSION

For the reasons stated above, we:

VACATE the jury's verdict of infringement; VACATE the district court's denial of JMOL on claims 1, 2, and 33; REVERSE the district court's denial of JMOL on claim 45; and REMAND the case to the district court for further proceedings in light of our claim construction and for entry of judgment of noninfringement of claim 45.

IV. COSTS

No costs.

VACATED-IN-PART, REVERSED-IN-PART, AND REMANDED.

GAJARSA, Circuit Judge, dissenting.

I respectfully disagree with the court's holding and reasoning. First, the court allows Ericsson to submit its *WMS Gaming* claim construction argument, for the first time, on appeal. Contrary to the court's analysis, the shift in claim construction is more than an "infinitesimal tweak in scope." The facts belie that position. It is in fact a paradigm shift which should not be tolerated. Ericsson procedurally defaulted by not making the argument to the trial court, and the facts of this case weigh against excusing the waiver. The court's approach misapplies our waiver jurisprudence and fails to understand the policies that regulate the proper relation of trial and appellate courts. Second, although it finds the infringement judgments flawed, the court nonetheless delves into the trial court's damage analysis. There is no final determination of liability, therefore the damages analysis is advisory. Issuing an advisory opinion is improper and we should refrain from doing so.

For these reasons, I must respectfully dissent.

I.

A.

The procedural facts are relatively straightforward. On July 20, 1999, this court issued its opinion in WMS Gaming Inc. v. Int'l Game Technology, 184 F.3d 1339 (Fed.Cir.1999). The court denied rehearing *en banc* on September 17, 1999. In WMS Gaming, the court held that the structure of a computing means, for purposes of section 112, ¶ 6, is the microprocessor programmed to carry out an algorithm recited in a patent's written description. 184 F.3d at 1349. The algorithm effectively converts the computer to a special purpose device that serves the function recited in the claim. *Id.* Although on appeal Ericsson argues the theory propounded by WMS Gaming, it never made the argument in the relevant pre-trial or trial proceedings below.

B.

At the pre-trial motions and hearings Harris and Ericsson vigorously disputed the proper construction of the time domain processing means in claim 1 of U.S. Patent No. 4,365,338 ("the '338 patent"). The relevant language was

> time domain processing means for simulating the time domain effect of said dispersive medium on signals transmitted through it by deducing prescribed characteristics of said medium, and for producing estimates of said information signals in accordance with a preselected relationship between said prescribed characteristics of said simulated effect and said known and received signals[.]

'338 patent, col. 17, ll. 54-61.

The matter was amply briefed by competent counsel. The parties submitted a joint claim construction brief on November 24, 1999. On December 2, 1999, five months after WMS Gaming issued, Ericsson filed its opening Markman brief. Ericsson filed a reply brief on December 6, 1999. The Master conducted a hearing on December 13-15, 1999. The Master issued a "draft" claim construction order on February 29, 2000, and asked for comments from the parties. Ericsson filed objections. After considering them, the Master issued his final two hundred page claim construction order on March 29, 2000.

The Special Master ruled that the "time domain processing means" of claim 1 was a means plus function claim term within the meaning of § 112, ¶ 6. The Special Master further ruled that the function of the time domain processing means was twofold: (1) "simulating the time domain effect of said dispersive medium on signals transmitted through it by deducing prescribed characteristics of said medium"; and (2) "producing estimates of said information signals in accordance with a preselected relationship between said prescribed characteristics of said simulated effect and said known and received signals." (Special Master's Final Claim Construction Order)

Between filing the joint brief in November 1999, and the Master's final order in March 2000, Ericsson made a series of claim construction arguments. In none of those arguments did Ericsson assert, directly or indirectly, the WMS Gaming argument now pressed on appeal. First, in the November joint brief and its opening Markman brief, Ericsson argued that the structure of the "time domain processing means" was fast array processor 37A. In its December 6 reply brief, however, Ericsson subtly shifted positions. In the reply, Ericsson argued that the relevant structure was "the fast array processor 37A and the support processor 37B in Fig. 4 and its equivalents." Ericsson further argued for limiting the "producing estimates" function identified by the Master. Thus, Ericsson argued that "producing estimates" meant "selecting discrete values that are closest to nondiscrete values that are close, but not equal to the unknown discrete values." Put differently, Ericsson vigorously contended that a "two-step" analytical process, as manifested in the "producing estimates" provision, was a functional limitation on the time domain processing means. As the court observes, *ante* at ----, Ericsson never argued to the trial court or Special Master--as it does on appeal--that the relevant structure was some group of microprocessors implementing the "decoding algorithm" described in the '338 patent. *See* '338 patent, cols. 5-9. In spite of the subtle changes Ericsson never made the WMS Gaming argument at this, or any other, stage of the trial proceedings.

Ultimately, the Special Master ruled that the relevant structure for the time domain processing means was "symbol processor 37." On April 18, 2000, Ericsson objected to the Master's final order and sought reconsideration in the district court. Nearly a year later, on March 23, 2001, the district court held a hearing on Ericsson's objections. In the April 2000 objections, and at the March 2001 hearing, Ericsson renewed its "producing estimates" argument. Ericsson thus elected to argue for a limitation on the *function,* rather than the *structure,* of the claimed time domain processing means. In neither the April 2000 objections, nor at the March 2001 hearing, did Ericsson make its current *WMS Gaming* argument to the district court.

The parties filed post-hearing briefs. On May 29, 2001, the district court overruled Ericsson's objections relating to the "producing estimates" function, but remanded for clarification, by the Master, concerning the construction of the term "information signals the value of which for which [sic] minimizes the sum of the squares" in claim 2. On May 31, 2001, the Master replied that no further clarification of the disputed claim 2 term was required. In July 2001, the district court adopted the Master's recommendation.

By letter brief on June 12, 2002, Ericsson sought further revision to the claim construction of the "information signals" term in claim 2. On August 2, 2002, the district court overruled Ericsson's continued objection and approved the Master's May 31, 2001, claim construction.

From October 7 to 29, 2002, three years after this court decided *WMS Gaming,* the lower court conducted a jury trial. The jury returned a verdict of infringement and assessed damages. Ericsson renewed its Rule 50 motion, asking for a judgment of no infringement. On August 7, 2003, the trial court denied it and entered judgment for Harris.

C.

In short, between the November 1999 joint claim construction and the trial court's August 2002 ruling, Ericsson actually had at least ten opportunities-- in the form of briefs and hearings--to make its claim construction arguments concerning the structure of the time domain processing means. Yet never in (1) the joint claim construction statement; (2) the opening Markman brief; (3) the reply brief; (4) the three days of argument at the Markman hearing; (5) post hearing briefs to the Master; (6) April 2000 objections to the Master's final report; (7) the district court's March 2001 hearing on the objections; (8) post-hearing briefs; (9) objections to the Master's May 2001 ruling; nor (10) Ericsson's June 2002 letter brief to the trial court; did Ericsson ever argue that *WMS Gaming* meant the structure of the claimed "time domain processing means" was the decoding algorithm described in the '338 patent specification. At each of these many opportunities, Ericsson argued that the structure of the "time domain processing means" was either processor 37A or processors 37A and 37B. The function, Ericsson argued, was limited by the meaning of "estimates" in "producing estimates". Nor did Ericsson make its current argument at any other time between the November 1999 joint claim construction brief and the August 2003 ruling denying Ericsson's Rule 50(b) motion. Throughout the proceedings below Ericsson argued, without fail, that the structure of the time domain processing means was some combination of the microprocessors disclosed in the '338 patent.

Now, on appeal, Ericsson awakens to the benefit of *WMS Gaming* and argues for the first time that it controls. Specifically, Ericsson now contends that the structure of the "time domain processing means" in claim 1 consists of "processors 37A and 37B programmed to perform the disclosed two-step algorithm [in the '338 patent]."

II.

It is a long-settled rule that appellate courts will not consider an issue neither pressed nor passed upon below. *See* *United States v. Williams,* 504 U.S. 36, 41, 112 S.Ct. 1735, 118 L.Ed.2d 352 (1992) ("Our traditional rule ... precludes a grant of certiorari only when the question presented was not pressed or passed upon below" [internal citation omitted]); *Duignan v. United States,* 274 U.S. 195, 200, 47 S.Ct. 566, 71 L.Ed. 996 (1927) (stating that "[i]t is only in exceptional cases ... that questions not pressed or passed upon below are reviewed," and collecting cases). The rule fully applies to claim construction arguments not made to the trial court. *See* *Interactive Gift Express, Inc. v. Compuserve Inc.,* 256 F.3d 1323, 1344-46 (Fed.Cir.2001); *Sage Prods., Inc. v. Devon Indus., Inc.,* 126 F.3d 1420, 1426 (Fed.Cir.1997).

As the Supreme Court has explained, this rule of appellate procedure is "essential in order that parties may have the opportunity to offer all the evidence they believe relevant to the issues ... (and) in order that litigants may not be surprised on appeal by final decision there of issues upon which they have had no opportunity to introduce evidence." Singleton v. Wulff, 428 U.S. 106, 120, 96 S.Ct. 2868, 49 L.Ed.2d 826 (1976) (quoting Hormel v. Helvering, 312 U.S. 552, 556, 61 S.Ct. 719, 85 L.Ed. 1037 (1941)). Fairness and finality lie at the core of this doctrine. Thus, the Supreme Court has noted, "[t]he verdict of a jury will not ordinarily be set aside for error not brought to the attention of the trial court. This practice is founded upon considerations of fairness to the court and to the parties and of the public interest in bringing litigation to an end after fair opportunity has been afforded to present all issues of law and fact." United States v. Atkinson, 297 U.S. 157, 159, 56 S.Ct. 391, 80 L.Ed. 555 (1936) (collecting cases). This court has also recognized the rule's importance in lending procedural certainty to claim construction arguments at trial. "A party's argument should not be a moving target. The argument at the trial and appellate level should be consistent, thereby ensuring a clear presentation of the issue to be resolved, an adequate opportunity for response and evidentiary development by the opposing party, and a record reviewable by the appellate court that is properly crystallized around and responsive to the asserted argument." Finnigan Corp. v. Int'l Trade Comm'n, 180 F.3d 1354, 1363 (Fed.Cir.1999). [FN1]

The courts describe the failure to make an argument to the trial court as a waiver, suggesting a party's conscious choice to withhold a known argument. [FN2] That description aptly describes Ericsson's failure to press its *WMS Gaming* argument below, as the decision plainly issued before any claim construction was undertaken in this action, and Ericsson had numerous and sufficient opportunities to raise the issue even after the claim construction had been concluded. Ericsson, moreover, is presumed to know the law. *See, e.g.,* Pittsburg & L.A. Iron Co. v. Cleveland Iron Min. Co., 178 U.S. 270, 278, 20 S.Ct. 931, 44 L.Ed. 1065 (1900). Ericsson waived its *WMS Gaming* argument by not making it below. Although the court need not decide it, the waiver may have attached when Ericsson failed to make the argument to the Special Master, in which case the case comes to us with two levels of procedural defaults. In any event, Ericsson has lost the right to make this argument on appeal. *See* Sage Prods., 126 F.3d at 1426 ("If a litigant seeks to show error in a trial court's overlooking an argument, it must first present that argument to the trial court.... [T]his court does not 'review' that which was not presented to the district court.").

Relying on *Interactive Gift* and Gaus v. Conair Corp., 363 F.3d 1284, 1288 (Fed.Cir.2004), the court holds that the argument was not waived. *See* maj. op. at ----. In *Interactive Gift* this court distinguished between new claim construction arguments, which "changed the scope of the claim construction," and arguments that merely clarified or defended "the original scope" of a claim construction offered below, or offered additional support for existing claim construction arguments by further citation to the patent specification. *Interactive Gift,* 256 F.3d at 1346. "Clarifying" arguments are not new, and not within the rule of waiver. Gaus applied that rule to find no waiver where, on appeal, the appellant altered the phrasing but not the content of the claim construction argument at issue. *See* Gaus, 363 F.3d at 1288. Pointing to this line of cases the court concludes that, because Ericsson focused on the concept of a two-step signal processing routine as a necessary limitation to the asserted claim--though through function rather than structure of the time domain processing means--the argument on appeal merely "clarifies" the Ericsson arguments below. Maj. op. at ---- - ----.

The majority's conclusion is plainly contrary to the law. First, its reliance on *Interactive Gift* and Gaus is misplaced. Neither case involved a means-plus-function claim term, nor did the parties in those cases try to substitute an argument on structure for an argument on function. Second, contrary to the majority's suggestion, ante at ----, our cases draw a firm distinction between the function, and the structure, of a means plus function claim term under § 112, ¶ 6. Shifting its premise from function to structure, Ericsson has presented a new and different argument. There clearly was a distinct paradigm shift in its argument and not merely a clarification.

That new argument has different implications for both the claim construction process, and the subsequent infringement analysis. First, the function and structure draw their meaning from separate, specifically defined components of the patent. When construing the term the court's task always begins with identifying the function, "staying true to the claim language and the limitations expressly recited by the claims." Omega Eng'g, Inc. v. Raytek Corp., 334 F.3d 1314, 1321 (Fed.Cir.2003); *see also* Generation II Orthotics, Inc. v. Med. Tech., Inc., 263 F.3d 1356, 1364-65 (Fed.Cir.2001) ("When construing the functional statement in a means-plus-function limitation, we must take great care not to impermissibly limit the function by adopting a function different from that explicitly recited in the claim."). By contrast, defining the structure turns on what is recited in the written description, clearly linked to the stated function, and necessary to perform that function. Omega Eng'g, 334 F.3d at 1321. These are distinct analyses that apply different analytical processes. An argument about function directs the court to the claim language itself, whereas an argument about structure directs the court to search the written description for necessary and linked structural descriptions.

Second, the function and structure have sharply distinct roles in the infringement analysis. Statutory infringement first requires that the accused device perform the *identical* function as the claimed means, but allows infringement with merely equivalent structure. [FN3] *See* Omega Eng'g, 334 F.3d at 1328-29; Odetics, Inc. v. Storage Tech. Corp., 185 F.3d 1259, 1266- 67 (Fed.Cir.1999). The infringement analysis for a § 112, ¶ 6 claim, in short, is more sensitive to perturbations in the definition of function (which must be exact) than structure (which allows for equivalents).

Ericsson made the function argument below. That was a strategic judgment, by Ericsson and its sophisticated counsel, concerning what they thought they could prove about the function of their accused devices. In short, had Ericsson prevailed on that function argument, in due course it presumably would have prevailed on summary judgment without the expense of trial. Ericsson must bear the legal burden of that strategic choice of arguments.

Which brings us to the heart of the matter. As noted above, waiver is the procedural device that makes trial the "main event" rather than a "tryout for the road" on a dispositive argument. Wainwright v. Sykes, 433 U.S. 72, 90, 97 S.Ct. 2497, 53 L.Ed.2d 594 (1977). As the Supreme Court noted in Wainwright, "[a]ny procedural rule which encourages the result that ... proceedings [below] be as free of error as possible is thoroughly desirable [.]" Id. The fact that this matter concerns claim construction, a legal issue this court reviews *de novo* primarily on the basis of intrinsic evidence, does not alter the purpose of the procedural device. Just as Wainwright observed with regard to the rule of Fay v. Noia, [FN4] refusing to enforce the waiver rule here "may encourage 'sandbagging' " on the part of patent counsel, "who may take their chances" on a verdict of no infringement in trial court "with the intent to raise" their new claim construction arguments on appeal "if their initial gamble does not pay off." Id. at 89, 97 S.Ct. 2497. The facts of this case suggest that is precisely what Ericsson has tried to do. Unfortunately, given the court's holding, their gamble has paid off. We have now established a new exception to the waiver rule--the *Oops I Forgot Rule:* no matter how many opportunities you have below to make the proper argument now you can make any argument at any time and the court will allow it.

The ultimate issue, of course, is the factual matter of infringement. Had Ericsson made its current argument below, Harris would have presented different evidence to meet it. Discovery may have taken a different course to meet the different issues. The jury would have heard a different case. Indeed, as the court notes, "the parties did not fully brief the issue of structural equivalence of one-step and two-step processes before the district court." Maj. op. at 21. The court overlooks that this briefing is missing because Ericsson argued that the two step limitation was functional, not structural, as they now argue on appeal. The gap in the record, which sufficiently troubles the court to warrant a remand, belies the court's contention that the new claim construction argument embodies the "same concept" as the arguments that Ericsson pressed below. Fairness and finality are not served by allowing Ericsson, instead, to keep the current argument *in pectorum* for appeal while trying the case on a different theory. The court should note that, unless a waiver is enforced, Ericsson's failure to make this argument in a timely fashion to the trial court will have wasted enormous resources before the Special Master, the trial court, the jury, and on behalf of the parties. All of which signal the court's error in finding that the WMS Gaming arguments are not waived.

For the same reasons, there is no cause for this court to excuse Ericsson's waiver. The Supreme Court has recognized that the appellate courts have discretion, on the facts of individual cases, to resolve issues not passed upon below. *See* Singleton, 428 U.S. at 121, 96 S.Ct. 2868. That discretion, however, is limited to exceptional circumstances not present here. Ericsson had abundant opportunity to make its current arguments below. There is, in this case, no manifest injustice in holding Ericsson to its choice of arguments before the Special Master and the trial court; nor does Ericsson's new argument raise issues of great public concern; nor, as the court's remand indicates, is the proper resolution of the new claim construction and infringement theories "beyond any doubt". Singleton, 428 U.S. at 121, 96 S.Ct. 2868. But with its holding the court improperly encourages parties to take their chances on a high stakes, potentially cost saving argument at trial, while proliferating new arguments on appeal. For various reasons this court already has a high reversal rate on claim construction issues, which tends to encourage appeals and, perhaps, discourage trial courts from heavily investing in claim constructions below. The court's holding will only intensify this problem, and further distort the proper trial-appellate relationship regarding claim construction.

In short, the court's holding is misguided. Ericsson waived its current claim construction argument, and the court should affirm the judgment of infringement of claims 1, 2, and 33 on that basis.

III.

In addition, although it expressly recognizes that "our conclusion with regard to infringement obviates the need to reach the issue [of damages] at this time," the majority proceeds to decide the damages issue in the Harris cross-appeal. Maj. op. at 24. It is axiomatic that this court should not render advisory opinions on appeal. Because with the court's mandate liability remains undetermined, the court should simply vacate the damages judgment.

* * *

In sum, I disagree with the court's refusal to conclude that Ericsson waived its appellate claim construction arguments under *WMS Gaming.* Moreover, the court simply should not delve into unnecessary damages issues. For these reasons, I respectfully dissent.

FN1. The notice date of August 17, 1998, is the date on which this lawsuit was filed. Harris does not claim that the Nokia letter or any other act prior to the filing of this lawsuit put Ericsson on notice of infringement of the '338 patent.

FN2. Separately, we are not persuaded by Harris's assertion that Ericsson is challenging the construction that Ericsson itself convinced the district court to adopt. To make this contention, Harris must narrowly parse the issue down to the construction of the term "time domain processing means," rather than looking at Ericsson's complete two-step claim construction argument. Ericsson argued that the claim required a two-step process; it even argued that the "time domain processing means" limitation was the basis for this requirement. "Judicial estoppel is designed to prevent the perversion of the judicial process and, as such, is intended to protect the courts rather than the litigants." *Data Gen. Corp. v. Johnson,* 78 F.3d 1556, 1565 (Fed.Cir.1996). We do not detect any "perversion of the judicial process" in Ericsson's challenge to a claim construction that is favorable in one detail but unfavorable on the whole.

FN3. Needless to say, we disagree with the view of the dissent that we have departed from our established law as to when waiver is enforced. As explained above, we think our ruling is consistent with previous practice.

Contrary to the dissent's unfounded fears, the court does not permit "a distinct paradigm shift" in Ericsson's argument, "overlook[ ] the fact that the jury returned a verdict that Ericsson literally infringed claim 1," waste resources, or "discourage trial courts from heavily investing in claim constructions below." Nor does it (or could it) establish an "Oops I Forgot Rule" that abolishes the doctrine of waiver from Federal Circuit law. As explained above, the court merely applies the "same concept" doctrine illuminated in *Gaus* to the facts presented by this case.

Indeed, the dissent never establishes that Ericsson's modified articulation of its claim construction would yield anything more than an infinitesimal tweak in scope, devoid of any practical consequence. Speculation that Harris would have put on different infringement evidence under essentially the same claim construction is unfounded. Notably, also, argument regarding the equivalence of one-step and two-step processes would have been as applicable to Ericsson's construction at trial as it is now. The district court, not Ericsson, precluded the parties from arguing such equivalence by declining to adopt a two-step construction.

Moreover, even if the dissent were correct (which it is not) that waiver applies, we would disagree with its conclusion that this case does not fit into any of the Supreme Court's exceptions. At least the "beyond any doubt" exception, and possibly the "manifest injustice" exception, would appear to apply. Indeed, Harris's failure, in over 60 pages of briefing to this court, to advance an argument supporting the district court's construction on the merits resoundingly confirms that the need for a reversal on claim construction is "beyond any doubt."

That the result on infringement under our construction may not yet be clear does not make the claim construction itself any less indisputable.

FN4. Even if we agreed with Harris that a one-step process was consistent with the disclosed algorithm, we would not follow Harris to its conclusion that "the district court's construction is correct[.]" Harris is clearly referring to the district court's "one-step" jury instruction as part of the court's "construction." Assuming that label is proper, we still do not believe that the instruction "claims 1, 2, 33, and 45 are not limited to equation 7 and cover a one or two-step process" constitutes a claim construction limited to the disclosed algorithm.

FN5. This contention was made for the first time by Harris's counsel in response to questioning at oral argument.

FN6. The dissent's concern with judicial economy, so heavily emphasized in its waiver discussion, appears to have evaporated with respect to the damages issues. We of course do not believe that we are foreclosed from analyzing the damages issues presented by this appeal. *Cf.* *Rhodia Chimie v. PPG Indus.,* 402 F.3d 1371, 1375 n. 2 (Fed.Cir.2005).

FN7. However, if the district court is aware of some reason that the royalty rate would have been different if claim 45 was not infringed, then a lower rate could apply.

FN1. The majority's assertion that "[a]n appellate court retains case-by-case discretion over whether to apply waiver," maj. op. at ----, mischaracterizes the limitations on our appellate jurisdiction and ignores the policies advanced by a sound waiver rule. Contrary to the ad hoc approach that the majority suggests, the Supreme Court is clear that waiver will be excused only in "extraordinary circumstances." *Duignan,* 274 U.S. at 200, 47 S.Ct. 566. As discussed further below, this court has outlined the exceptional circumstances in which it might be proper to excuse a waiver. The majority, however, does not explain how this case fits any of the recognized exceptions, nor why a new exception is warranted.

FN2. *Cf.* *Johnson v. Zerbst,* 304 U.S. 458, 464, 58 S.Ct. 1019, 82 L.Ed. 1461 (1938) ("A waiver is ordinarily an intentional relinquishment or abandonment of a known right or privilege.").

FN3. The majority overlooks the fact that the jury returned a verdict that Ericsson literally infringed claim 1.

FN4. In *Fay v. Noia,* 372 U.S. 391, 439, 83 S.Ct. 822, 9 L.Ed.2d 837 (1963), the Supreme Court suggested a broad standard under which state convicts could obtain federal habeas review absent a "knowing and deliberate waiver", by the prisoner, of an asserted federal constitutional issue. In *Wainwright,* the Court rejected the *Fay* suggestion of such a narrow waiver rule, concluding that it encouraged strategic manipulation by litigants.

--- F.3d ----

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- 03-1625 (Docket) (Sep. 11, 2003)
- 03-1626 (Docket) (Sep. 11, 2003)

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